

BIOLOGY  
INVESTIGATION  
EXPERIMENTAL DESIGN

NAME \_\_\_\_\_

DATE \_\_\_\_\_ PER \_\_\_\_\_

NC Standard Course of Study:

Competency Goal 5: Students will develop an understanding of the behavior of organisms, resulting from a combination of heredity and environment.

PURPOSE

- to study the responses of the common pill bug (sow bug, isopod) to a variety of solutions.
- to analyze the various parts of an experiment

PART I – Follow the given procedure for this part of the lab.

INITIAL OBSERVATIONS:

Land isopods (including sow bugs and pill bugs) live in dark, moist places beneath undisturbed objects lying on the ground -- rotting logs, boards, bricks, or rocks. Sometimes isopods can be found alongside buildings where there is moisture and food (decaying matter, fungi). Living organisms, in general, avoid some chemicals and are attracted to others.

MATERIALS:

4 sow bugs or pill bugs  
petri dish  
paper towel or filter paper  
droppers

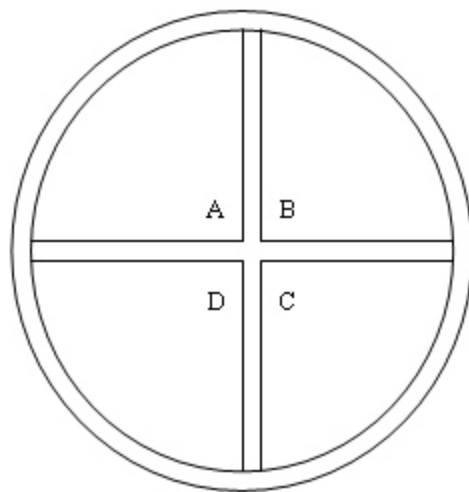
water  
1% solution of salt  
1% solution of sugar  
1% solution of vinegar

HYPOTHESIS: Read the procedure for this experiment. State one hypothesis that is being tested by this experiment. Your hypothesis might answer the question: Which chemicals will attract or repel the isopods and why?

(hypothesis) \_\_\_\_\_

PROCEDURE:

1. Cut paper toweling or filter paper to fit a petri dish as shown in this diagram. Leave about 0.5 cm between the pieces of paper.
2. Label the four sections A, B, C, and D.
3. Place drops of solution on the sections of towel. Be sure that the paper is totally wet BUT that no solutions run together. The paper pieces should lie flat on the petri dish. A= water, B = salt solution, C = sugar solution, D = vinegar solution
4. Place 4 isopods in the middle and begin recording where they are every 15 seconds for 5 minutes.



OBSERVATIONS:

Record general observations about the isopods here: What do they look like? How do they move? How do they appear to "sense" their environment? Etc.

DATA CHART FOR ISOPOD EXPERIMENT: (Record the number of isopods on each section at the time indicated)

TIME	A - water	B - salt	C - sugar	D - vinegar	In between
0 seconds					
15					
30					
45					
1 minutes					
15					
30					
45					
2 minutes					
15					
30					
45					
3 minutes					
15					
30					
45					
4 minutes					
15					
30					
45					
5 minutes					
Total for each solution					

TIME	A - water	B - salt	C - sugar	D - vinegar	In between
Class Average for each solution					

**Create a Bar Graph showing the Class Averages for each solution.**

CONCLUSIONS:

1. What parts of the experiment are controlled?
2. What are the variables?
3. Was your hypothesis supported? Use the data to explain your answer.
4. Use what you know about organisms, cells, and homeostasis to explain your results.
5. What are the survival advantages for the behavior that you observed?
6. How could this experiment be improved?

PLAN YOUR OWN EXPERIMENT:

Now, design your own experiment to test the response of pill bugs to some other environmental conditions such as light versus dark, dry versus moist, different concentrations of the same solution, different solutions, or something else that you are curious about. Be sure to include all the parts of a good experimental design.

- a. List the relevant initial observations.
- b. State your hypothesis
- c. List your materials
- d. Give the steps of your procedure.
- e. Create a NEAT data chart and graph and attach them to this lab report.
- f. What is the control?
- g. What are the variables?
- h. What are your conclusions? Be sure to cite your data and explain your results.
- i. What would you do differently, if you could redesign your experiment?